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A REVIEW OF THE AMERICAN SPECIES OF THE GENUS TRACHYNOTUS.

BY SETH E. MEEK AND DAVID K. GOSS.

In the present paper we give the synonymy of the species of *Trachynotus* found in American waters, with brief descriptions of those known to us found on the Atlantic Coast. The latter are here all described from specimens obtained by Professor Jordan at Havana and Key West. We are very much indebted to Professor Jordan for use of his library and for valuable aid.

In the following analysis of species, *Trachynotus marginatus* is omitted, the original description being too insufficient for comparison. Of the remaining seven species, two (*rhomboides*, *glaucus*) appear to be confined to the Atlantic; two others (*kennedyi*, *fasciatus*) represent those on the Pacific Coast, while the others (*rhodopus*, *carolinus*, *cayennensis*) appear to be found on both sides, although in the case of *rhodopus* and *carolinus* being far more abundant in the Atlantic.

Analysis of Species of Trachynotus.

a. Dorsal with 19 to 20 soft rays; anal with 17 to 19 soft rays.
  b. Body very much compressed; sides with narrow black cross-bars; lobes of vertical fins elongate, reaching past middle of caudal fin in adult.
    c. Snout subtruncate or nearly vertical; profile from supraorbital to front of dorsal fin convex. *glaucus.* 1.
    cc. Snout low, very oblique; profile from supraorbital region to the dorsal scarcely convex. *fasciatus.* 2.
  bb. Body moderately compressed; sides without narrow black cross-bars; lobes of vertical fins shorter, rarely reaching base of caudal; lobes of dorsal and anal usually blackish.
    d. Body broad, ovate; the greatest depth at all ages more than half length of body; lobes of the vertical fins reaching in the adult beyond the middle of their fins.
      e. Axil with a large black spot (in the adult); profile strongly convex anteriorly. *kennedyi.* 3.
      ee. Axil without dark spot; profile from nostril to dorsal everywhere about equally convex. *rhomboides.* 4.

dd. Body oblong; the depth in young and old about $\frac{2}{5}$ length of body. *rhodopus.* 5.

aa. Dorsal with 25 to 27 soft rays; anal with 22 to 26 soft rays; body oblong, rather robust; greatest thickness 3 in greatest depth of body; depth less than half length; lobes of vertical fins short, not black; sides without dark cross-bars.

f. Dorsal with 25 soft rays; anal with 22 soft rays; profile from snout to procumbent spine evenly convex. *carolinus.* 6.

ff. Dorsal with 27; anal with 26 soft rays. *cayennensis.* 7.

Trachynotus glaucus. *Gaff-top-sail Pompano. Old wife.*

Chætodon glaucus Bloch, Ichthyologia, Pl. ccx, about 1783 (on a figure by Plumier).

Acanthinion glaucus Lacépède, iv, 1803, 500 (copied).

Trachinotus glaucus Cuvier & Valenciennes, Hist. Nat. Poiss., viii, 1831, 400 (Brazil, Havana, Mexico, San Domingo, Martinique and Guadeloupe); Guichenot, "Poiss. Ramon de la Sagra, Hist. Cuba, 107, 1845" (Cuba).

Trachynotus glaucus Günther, Cat. Fishes Brit. Mus., ii, 1860, 483 (Antilles, Jamaica and Rio Janeiro); Gill, Proc. Acad. Nat. Sci. Phila., 1862, 438 (Charleston, S. C.); Gill, Rep. U. S. Fish Com., 1871–2, 803 (name only); Goode, Proc. U. S. Nat. Mus., 1879, 112 (name only); Goode, Bull. U. S. Fish Com., 1881, 37, 40 (Bermudas); Goode & Bean, Proc. U. S. Nat. Mus., 1882, 237 (name only); Jordan & Gilbert, Proc. U. S Nat. Mus., 1882, 270 (Pensacola); Jordan & Gilbert, Syn. Fish. N. A., 1882, 443; Jordan & Gilbert, *op. cit.*, 912.

Habitat.—Atlantic Coasts of America: Charleston, Pensacola, Key West, Bermudas, Jamaica, Antilles, Guadaloupe, Martinique and Rio Janeiro. Also erroneously ascribed (by confusion with *Trachynotus fasciatus*) to Lower California and Panama.

Head 4 in length of body; depth 2; D. VI–I, 19; A. II–I, 18; length (No. 440, I. U. Key West) 13 inches.

Body elliptical, much compressed; snout blunt, subtruncate, vertical from mouth to horizontal from upper edge of eye; the profile from supraorbital to front of dorsal fin convex; eye 3$\frac{3}{5}$ in head; mouth nearly horizontal; maxillary nearly reaches vertical from middle of eye, its length 3 in head; jaws without teeth in the adult; dorsal spines separate, in the adult; dorsal and anal fins falcate, the anterior soft rays reaching middle of caudal fin; dorsal lobe 1½, anal 1¾ in length of body; ventrals reaching ⅘ distance to vent, their length 2⅖ in head; caudal very deeply forked, their lobes nearly half length of body. Color bluish above, golden below; lobes of dorsal and anal very dark, rest of the fins pale, with bluish edges; caudal bluish; Pectorals golden and bluish; ventrals whitish. Body crossed by four black vertical bands; the first is under the procumbent spine, the second under the third dorsal spine, the third and fourth under the soft dorsal. A black spot, representing a fifth band, on latter line between the last rays of dorsal anal; this is sometimes obsolete; the position of these bands appears to be subject to slight variation. The young of this species has not yet been described.

Trachynotus fasciatus.

Trachynotus fasciatus Gill, Proc. Acad. Nat. Sci. Phila., 1863, 86 (Cape San Lucas); Günther, Fishes Cent. America, 1869, 434 (Panama, San Jose and Nicaragua); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 232 (Porto Escondido, Mexico); Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 106 (Mazatlan, no description); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 359 (Cape San Lucas, no description).

Trachynotus glaucoides Günther, Proc. Zool. Soc., 1864, 150 (San Jose; Nicaragua).

Habitat.—Pacific Coast of Tropical America: Cape San Lucas, Mazatlan, Porto Escondido, San Jose, Nicaragua, and Panama.

This species is the Pacific representative of *Trachynotus glaucus*, which species it strongly resembles. The difference in the profile is, however, constant and characteristic.

Trachynotus kennedyi.

Trachynotus kennedyi Steindachner, Ichthyol., Beiträge, iii, 1875, 47, Pl. vii, (Magdalena Bay); Günther, Fish. Cent. Amer., 1869, 388 (in part, Panama).

Trachynotus ovatus Lockington, Proc. Cal. Acad. Nat. Sci., 1876, 4 (Lower California); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 375 (Panama, not of Cuv. & Val.).

Trachynotus rhomboides Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 625 (Panama, young).

Trachynotus rhodopus Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 106 (Mazatlan, not of Gill).

Habitat.—Pacific Coast of Tropical America: Magdalena Bay, Mazatlan, Panama.

This species is the Pacific Coast representative of *Trachynotus rhomboides*, from which it differs in the presence of a black axillary spot, and slightly in form of the profile. The young lack this spot, and cannot readily be distinguished from the young of *Trachynotus rhomboides.* It is therefore probable that all the references made by authors to the occurrence of *T. rhomboides* (*ovatus*) on the Pacific Coast of Tropical America refer to this species. A series brought by Professor Gilbert from Panama (now unfortunately destroyed) is said to render this view very probable. We are informed by Professor Jordan that the specimens brought by Professor Gilbert from Mazatlan, recorded as *T. rhodopus*, belong to this species, of which the latter cannot be the young, as was at first supposed.

Trachynotus rhomboides. *Round Pompano; Palometa.*

Chætodon rhomboides Bloch, Ichthyologia, ccix, about 1783 (on a drawing by Plumier); Gmelin, Syst. Nat., 1788, 1259 (copied).

Acanthinion rhomboides Lacépède, Hist. Nat. Poiss., iv, 1803, 500 (copied).

Trachinotus rhomboides Cuvier & Valenciennes, Hist. Nat. Poiss., viii, 1831, 407 (Martinique); Guichenot "Poiss. Ramon de la Sagra, Hist. Cuba, 1845, 108" (Cuba).

Trachynotus rhomboides Lütken, Spolia Atlantica, 1880, 602 (West Indies); Jordan & Gilbert, Syn. Fish. N. A., 1882, 974.

Spinous dory Mitchill, Trans. Lit. and Phil. Soc., 1815, Pl. vi, f. 10 (no description).

Trachinotus fuscus Cuvier & Valenciennes, Hist. Nat. Poiss., viii, 1831, 410 (Brazil).

Trachinotus spinosus De Kay, N. Y. Fauna Fishes, 1842, 117, Pl. xix, fig. 53 (New York Harbor); Storer, "Syn. Fish. N. A., 1846, 98."

Lichia spinosus Baird, Ninth Smithsonian Rep., 1854, 22 (Beesley's Point, New Jersey).

Doliodon spinosus Girard, U. S. and Mex. Bd. Surv., 1859, 22 (St. Joseph's Island, Texas); Gill, Cat. Fish. East Coast N. A., 1861, 37 (name only).

Trachynotus ovatus Günther, Cat. Fish. Brit. Mus., ii, 1860, 481 (in part, West Indian specimens, apparently not *Gasterosteus ovatus*, which is the Asiatic species); Gill, Proc. Acad. Nat. Sci. Phila., 1862, 438; Gill, Proc. Acad. Nat. Sci. Phila., 1863, 332; Gill, Rep. U. S. Fish Com., 1871–2, 803; Baird, Rep. U. S. Fish Com., 1871–2, 825 (Wood's Holl, Mass.); Goode, Proc. U. S. Nat. Mus., 1879, 112 (name only); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 376 (Beaufort, N. C., no description); Goode & Bean, Proc. U. S. Nat. Mus., 1879, 339 (Marquesas Keys, Fla.); Goode, Bull. U. S. Fish Com., 1880, 24 (name only); Goode, Bull. U. S. Fish Com., 1881, 36–39; Goode & Bean, Proc. U. S. Nat. Mus., 1882, 237 (name only); Jordan & Gilbert, Syn. Fish. N. A., 1882, 442.

Habitat.—Atlantic Coast of America: Wood's Holl, New York, Beesley's Point, Beaufort, Marquesas Keys, Key West, St. Joseph's Island, Martinique, and Brazil.

Head $3\frac{3}{4}$ in length; depth $1\frac{3}{5}$; D. VI–I, 19; A. II–I, 18; length (No. 486, I. U. Havana) 18 inches.

Body broadly ovate, moderately compressed; profile very evenly convex from procumbent spine to horizontal from upper edge of eye, where it descends almost vertical. The vertical portion is about $1\frac{1}{3}$ times the eye; length of snout nearly equals the eye; mouth nearly horizontal; maxillary reaching to the vertical from middle of eye, its length $2\frac{2}{3}$ in head; jaws without teeth in adult; dorsal spines short and thick, not connected by membrane in adult; ventrals short, their tips scarcely reaching half way to anterior anal spine; 3 in head; caudal widely forked; lobes about $2\frac{2}{3}$ in length of body; dorsal and anal fins falcate; anterior rays reaching almost to posterior end of fins; in adults, dorsal lobe $2\frac{2}{3}$, anal lobe $4\frac{1}{2}$, in length of body. Color bluish above, silvery below; lobes of dorsal black in young; in adults the fins are all bluish with lighter tips.

The young differ from the adult as above described in the following respects: The profile is scarcely convex; snout shorter and less vertical; spines much longer and connected by membranes; lobes of vertical fins shorter; dorsal lobe with black; fins all much paler; jaws with bands of villiform teeth; eye larger; color much paler.

We have had no opportunity of comparing the American *Trachynotus rhomboides* with the East Indian *Trachynotus ovatus* with which it has been identified by Dr. Günther. We have been led to consider them as distinct by the following observation of Dr. Lütken: "I will only remark that the *Trachynotus rhomboides* of the Antilles has already its rhomboidal physiognomy and the falcations of its fins strongly prolonged at an age at which, in the *Trachynotus ovatus* of the seas of the Indies, these prolongations of the fins are quite short. I am of the opinion (with Mr. Gill) that these two species ought, at least provisionally, to be considered as distinct."

As the antecedent probabilities are against the identity of these species in such widely separated faunæ, there is less danger of confusion in regarding the two as different.

Trachynotus rhodopus. *Permit. Great Pompano.*

Trachynotus goreënsis Günther. Cat. Fish. Brit. Mus., 1860, 483 (specimens from Caribbean Sea; in part, not of Cuvier & Valenciennes); Goode & Bean, Proc. U. S. Nat. Mus., 1879, 129 (West Florida, Jupiter's Inlet); Goode & Bean, Proc. U. S. Nat. Mus., 1879, 339 (West Florida, Marquesas Keys); Goode, Proc. U. S. Nat. Mus., 1879, 112 (name only); Goode, Bull. U. S. Fish Com., 1881, 36, 40 (Key West and Jupiter's Inlet); Goode, Bull. U. S. Nat. Mus., 1880, 24 (name only); Goode & Bean, Proc. U. S. Nat. Mus., 1882, 237 (name only); Jordan & Gilbert, Syn. Fish. N. A., 1882, 442; Jordan & Gilbert, *op. cit.*, 1882, 974.

Trachynotus rhodopus Gill, Proc. Acad. Nat. Sci. Phila., 1863, 85 (Cape San Lucas; young).

Trachynotus nasutus Gill, Proc. Acad. Nat. Sci., 1863, 85 (Cape San Lucas; very young).

Trachynotus carolinus, Poey, Syn. Pisc. Cubensium, 1868, 371 (Cuba); Poey, Enumeratio Pisc. Cubensium, 1875, 86.

Habitat.—Both coasts of Tropical America: West Florida, Jupiter's Inlet, Marquesas Keys, Key West, Cuba, Caribbean Sea, Cape San Lucas.

Head 3 in length; depth $2\frac{3}{5}$; D. VI–I, 19; A. II–I, 17; length of specimen described (Key West), $2\frac{1}{3}$ inches.

Body oblong, elliptical, moderately compressed; profile nearly straight from procumbent spine to nostril, where it descends nearly vertical, forming an angle; vertical portion from angle to snout nearly equals the eye; maxillary reaches slightly behind vertical from middle of eye, its length $2\frac{3}{5}$ in head; jaws with bands of villiform teeth (these disappearing with age); ventrals reaching $\frac{4}{5}$ distance to vent, their length 2 in head; tips of pectorals reaching slightly past tips of ventrals; dorsal spines connected by a membrane, which is only characteristic of the young. Dorsal and anal fins falcate, their anterior soft rays less elevated than in *Trachynotus rhomboides*, but extending beyond middle of fins when depressed. Length in the young 4 in length of body; caudal forked, lobes about 3 in body; lateral line nearly straight, slightly curved upwards above the pectorals; color bluish silvery above, silvery below; dorsal, caudal and anal lobes blackish; no cross-bars.

This species grows to a much larger size than any other of the genus found in our waters; specimens of 2 to 3 feet in length being not uncommon in Florida and Cuba. It has been identified with the *Trachynotus goreënsis* of Cuvier & Valenciennes, by most American authors, this being a species from the West Coast of Africa. The basis of this identification appears to be insufficient. According to Cuvier & Valenciennes this *Trachynotus* *goreënsis* is a deeper fish than ours is at any age. Its outline and coloration are also different.

Trachynotus maxillosus Cuvier & Valenciennes, also from Africa, comes much nearer our fish, but this differs too much to be safely identified with it.

On the other hand, our young specimens correspond exactly to the two descriptions of little Trachynoti taken by Xantus at Cape San Lucas, published by Professor Gill; the larger one ($2\frac{1}{3}$ inches in length) corresponds entirely to the *T. rhodopus*, the smaller one ($1\frac{1}{10}$ inches in length) to *T. nasutus*. There is, however, no other record of the occurrence of our species in the Pacific.

The drawings and notes made by Professor Poey, of the species called by him *T. carolinus*, have been examined by Professor Jordan. They belong to *T. rhodopus*. *T. carolinus* is therefore as yet not known from Cuba.

Trachynotus carolinus.

Gasterosteus carolinus Linnæus, Syst. Nat., ed. 12, 1766, 490 (Carolina).

Doliodon carolinus Girard, Proc. Acad. Nat. Sci. Phila., 1858, 168; Girard, U. S. & Mex. Bd. Surv., 1839, 22, Pl. xi, fig. 4 (St. Joseph's Island, Texas); Gill, Cat. Fish. East Coast N. A., 1861, 37 (name only).

Trachynotus carolinus Gill, Proc. Acad. Nat. Sci. Phila., 1862, 438; Gill, *op. cit.*, 1863, 84 (Cape San Lucas); Gill, Proc. Acad. Nat. Sci. Phila., 1863, 332 (name only); Gill, Rep. U. S. Fish Com., 1871–2, 803 (name only); Baird, Rep. U. S. Fish Com., 1871–2, 825 (Wood's Holl); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 377 (Beaufort, N. C., no description); Goode & Bean, Proc. U. S. Nat. Mus., 1879, 129 (Pensacola, Fla.); Goode & Bean, Proc. U. S. Nat. Mus., 1879, 112 (name only); Bean, Proc. U. S. Nat. Mus., 1880, 90 (Wood's Holl, New York and Newport, R. I.); Goode, Bull. U. S. Fish Com., 1881, 36; Goode & Bean, Proc. U. S. Nat. Mus., 1882, 237; Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 596 (Charleston, S. C., no description); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 359 (Cape San Lucas); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 270 (Pensacola, Fla., no description); Goode, Bull. 21, U. S. Nat. Mus., 1880, 24 (name only); Jordan & Gilbert, Syn. Fish. N. A., 1882, 442; Jordan, Proc. Acad. Nat. Sci. Phila., 1884, 45 (Egmont Key).

Trachinotus cupreus Cuvier & Valenciennes, Hist. Nat. Poiss., viii, 1831, 414 (Martinique).

Trachinotus argenteus Cuvier & Valenciennes, Hist. Nat. Poiss., 1831, 413 (Martinique); Storer, Syn. Fishes N. A., 1846, 98.

Trachynotus argenteus Gill, Cat. Fish. East Coast N. A., 1861, 37 (name only).

Trachynotuspampanus Cuv. & Val., *op. cit.* (Charleston, S. C.); Storer, Syn. Fish. N. A., 1846, 99.

Trachynotus pampanus Günther, Cat. Fish. Brit. Mus., ii, 1860, 484 (Jamaica); Gill, Proc. Acad. Nat. Sci. Phila., 1862, 262 (Cape San Lucas).

Bothrolœmus pampanus Holbrook, Ich. S. Cav., 1860 (Charleston); Gill, Cat. Fish. East Coast N. A., 1861, 37 (name only).

Lichia carolina DeKay, N. Y. Fauna, iv, 1842, 114, Pl. x, f. 3 (Sandy Hook); Storer, Syn. Fish. N. A., 1846, 96; Baird, Ninth Rep. Smith. Inst., 1854, 21 (Beesley's Point, N. J.).

Habitat.—Atlantic (and Pacific) Coasts of America: Wood's Holl, Newport, Sandy Hook, Beesley's Point, Beaufort, Charleston, Pensacola, St. Joseph's Island, Egmont Key, Key West, Martinique and Cape San Lucas.

Head 4 in length; depth $2\frac{2}{5}$; D. VI–I, 25; A. II–I, 22. Length (No. 434, I. U., Key West) $15\frac{1}{2}$ inches.

Body oblong, comparatively robust; greatest thickness 3 in greatest depth. Snout from mouth to horizontal from upper edge of eye nearly vertical, somewhat bluntly rounded; profile from upper edge of snout to procumbent spine evenly convex. Mouth nearly horizontal, maxillary reaching to vertical from middle of eye, its length $2\frac{7}{8}$ in head; eye $4\frac{1}{2}$ in head, about as long as snout. Jaws without teeth in adult. Ventrals reach $\frac{3}{5}$ distance to vent, about 2 in pectorals, $2\frac{1}{2}$ in head. Dorsal and anal fins falcate; anterior rays nearly reach middle of fins when depressed; dorsal lobe $4\frac{1}{2}$; anal $5\frac{1}{2}$ in length of body. Color bluish above, silvery or slightly golden below; pectorals and anal light orange shaded with bluish; caudal and upper portion of caudal peduncle with bluish reflections.

On our South Atlantic and Gulf Coasts this is by far the most abundant species of the genus, and it is the one most esteemed as food. Its distribution in the West Indies is little known, the only positive record from points south of Key West being that of "*Trachynotus cupreus*" from Martinique. The only specimens known from the West Coast are those taken by Xantus at Cape San Lucas. While we have no good reason to doubt that the specimens now in the National Museum really came from Xantus, it is strange that no later collectors in Lower California and Sinaloa have found either this species or *Trachynotus rhodopus.*

Trachynotus cayennensis.

Trachinotus cayennensis Cuvier & Valenciennes, Hist. Nat. Poiss., viii, 1831, 417 (Cayenne); Günther, Cat. Fish. Brit. Mus., ii, 1860, 485 (copied).

? *Trachinotus paitensis* Cuv. & Val., *op. cit.*, viii, 1831, 438 (Peru).

Nothing is known of this species except what is contained in the two meagre descriptions noticed above. No difference is indicated by which the Pacific Coast fish (*paitensis*) is to be known from the Atlantic one. Both appear to differ from *T. carolinus* in the still longer vertical fins.

Trachynotus marginatus.

Trachinotus marginatus Cuvier & Valenciennes, Hist. Nat. Poiss., viii, 1831, 411 (Montevideo).

This species appears to be allied to *Trachynotus rhodopus* and *T. goreënsis*, but the description is too brief to give much idea of its relations.

Recapitulation.

We have in this paper admitted eight species of *Trachynotus*, as found in American waters. Some doubt is attached to the nomenclature of some of them. We give in the following list a brief indication of the questions remaining to be solved in each case:—

Genus **TRACHYNOTUS** Lacépède.

1. **T. glaucus** Bloch.
2. **T. fasciatus** Gill.
3. **T. kennedyi** Steindachner (possibly to be considered as a geographical variety of *T. rhomboides* or of *T. ovatus*).
4. **T. rhomboides** Bloch (possibly identical with the East Indian *T. ovatus* Linnæus; if so, to take the latter name).
5. **T rhodopus** Gill. Very improbably identical with *T. goreensis* Cuv. & Val.; possibly identical with *T. maxillosus* Cuv. & Val., both of them being African species of prior date. Possibly not really found in the Pacific).
6. **T. carolinus** Linnæus (possibly not occurring in the West Indies or in the Pacific).
7. **T. cayennensis** Cuv. & Val. (imperfectly described; possibly the Pacific form of *T. paitensis* is distinct).
8. **T. marginatus** Cuv. & Val. (imperfectly described and doubtful).